Trend Study 4-14-01

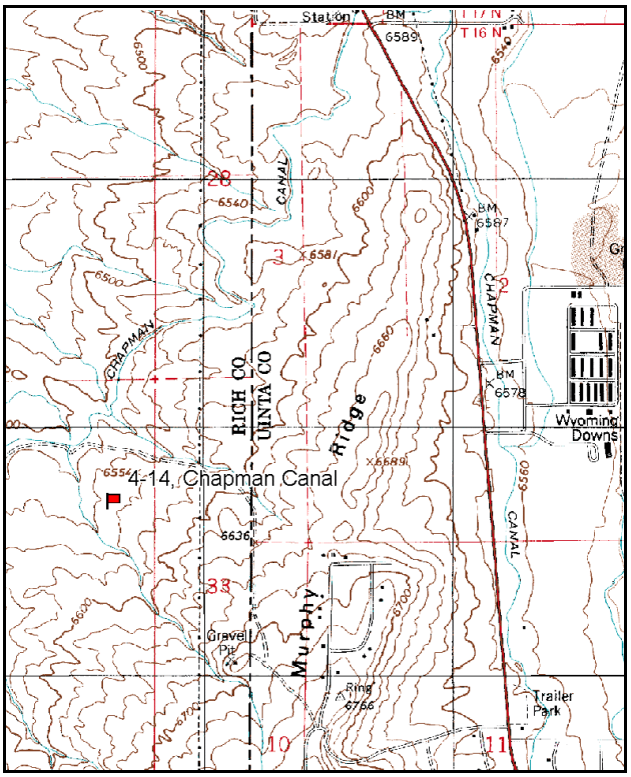
Study site name: Chapman Canal . Vegetation type: Big Sagebrush-Grass .

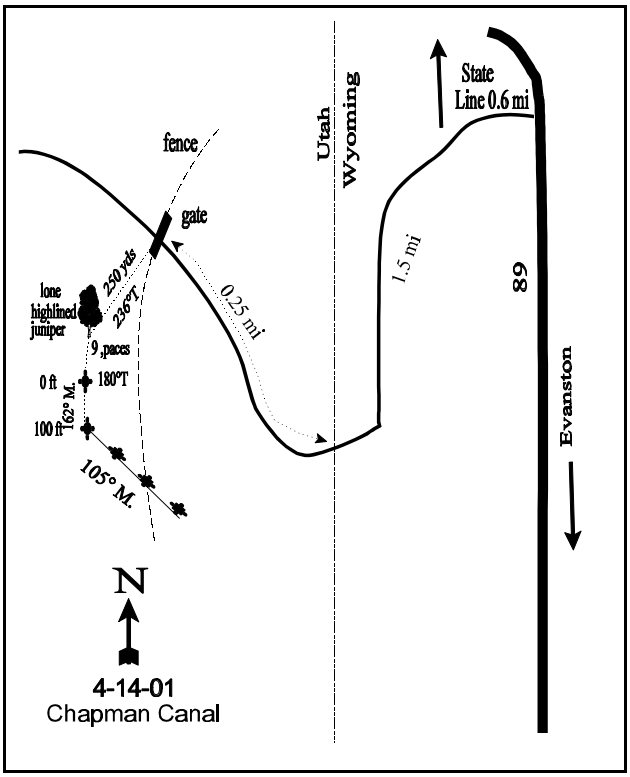
Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (71ft), line 3 (59ft), line 4 (34ft).

LOCATION DESCRIPTION

From the state line southbound on Highway 16/89, proceed 0.6 miles towards Evanston and turn right (west). Proceed 1.5 miles, crossing Chapman Canal, to a gate (DL&L). Go through the gate and travel 0.25 miles to a fence/gate. From the gate walk approximately 130 paces at 218 degrees magnetic to a lone high lined juniper. This is the only juniper present in the area. From the tree walk 9 paces at 165 degrees magnetic to the 0-foot stake of the baseline, marked with browse tag #7939. The baseline doglegs after 100 feet an runs 105 degrees magnetic.





Map Name: Neponset Reservoir NE Diagrammatic Sketch

Township 8N , Range 8E , Section 32 UTM 4581670 N 495612 E

DISCUSSION

Trend Study No. 4-14

The Chapman Canal trend study samples an area that, at first glance, would appear to have little value as big game winter range. Located close to the Wyoming state line, this study lies in the midst of an extensive big sagebrush-grass type that extends for miles before any cover from trees or terrain is discernible. However, large numbers of deer, elk, antelope, sage grouse, horses, and cattle all utilize the area. A brood of Hungarian partridge were also observed at the time of study establishment in 1984. In addition, five winter killed deer carcasses were encountered that same year. Deer use was moderately heavy in 1996 with a pellet group quadrat frequency of 24%. A few elk pellet groups were also encountered. A pellet group transect read on site in 2001, estimated 30 deer, 5 elk and 5 cow days use/acre (74 ddu/ha, 13 edu/ha and 13 cdu/ha). All deer pellet groups appear to be from winter use. About half of the elk pellet groups appeared to be from winter use, while the other half were from spring or early summer use.

The site varies from nearly level to perhaps a 10% west facing slope. Elevation is 6,560 feet. Soil is "Duckree Gravelly Loam," a category typified by moderately deep, well drained, rapidly permeable soils, formed in alluvium from quartzite, chert, and sandstone. This soil is strongly calcareous and alkaline at all depths. Available water capacity is low and the erosion hazard is moderate (Campbell and Lacey 1982). Soil at the site has an estimated effective rooting depth of nearly 11 inches. Soil texture is a clay loam with a moderately alkaline soil reaction (pH of 8.0). Phosphorus could be a limiting factor at only 5.5 ppm because values of less than 10 ppm have been shown to limit plant growth and development. Organic matter is also relatively low at only 1.9%. Ground cover is poor and comes primarily from the shrub crowns. Most shrub interspaces are barren and some soil compaction from trampling is evident. Sheet and gully erosion is noticeable throughout the area, but is not excessive. The soil erosion condition class was determined as slight in 2001.

The key browse species is Wyoming big sagebrush which contributes the most browse cover (69% to 78%). Wyoming big sagebrush was generally low in stature and heavily browsed in 1984. Vigor was poor on 18% of the population and although there was noticeable decadence among larger plants, there appeared to be adequate reproduction. By 1990, the population remained comparable, although utilization was more moderate and vigor improved. The population declined by 46% by 1996, primarily due to the reduction in the number of young plants from 2,133 to only 60. Some of the decrease in numbers is due to the extended drought of the late 1980's, yet the larger sample size utilized in 1996 gives a greatly improved estimate of browse populations. Density was estimated at 4,040 plants/acre in 2001. Utilization of the sagebrush was light to moderate, vigor good on most plants, and percent decadence actually dropped slightly. No seedlings were encountered and young plants are still lacking.

Narrowleaf low rabbitbrush is abundant yet on average accounts for only 23% of the total browse cover. Its population has remained fairly stable since 1984 at about 4,200 plants/acre. Mature plants are small, averaging only 8 inches in height in 2001. They are mostly unutilized and in good vigor.

The herbaceous understory is characterized by adequate diversity among grasses, but few quality forbs. The most common grass is Sandberg bluegrass which accounted for 67% of the total grass cover in 1996 and 2001. Western wheatgrass is also fairly common. Annual cheatgrass was picked up in the 2001 sample, but it only occurred in small numbers. By far the most abundant forbs include hoods phlox and longleaf phlox, two low value perennial forbs.

1984 APPARENT TREND ASSESSMENT

Trend appears basically stable. Some erosion is occurring but is limited by the gentle terrain. However, there is an active gully in the area which indicates the potential for erosion. Vegetative trend indicators suggest that the key species, Wyoming big sagebrush, "turns over" rather quickly but is stable insofar as population maintenance is concerned.

1990 TREND ASSESSMENT

At the Chapman Canal site, as suggested in 1984, the Wyoming big sagebrush population is dynamic in terms of age class structure, but fairly stable concerning total density. The sagebrush has a moderate to heavily hedged growth form. Sagebrush canopy cover averaged about 21%. Western wheatgrass and Sandberg bluegrass are very abundant and lightly used. Western wheatgrass increased slightly in nested frequency while Sandberg bluegrass declined slightly. Even with the fair understory, shrub interspaces are bare with 41% bare soil. Litter cover has declined slightly but cryptogamic and basal vegetation cover have increased. Soil movement is excessive considering the gentle terrain.

TREND ASSESSMENT
soil - stable but in poor condition (3)
browse - stable (3)
herbaceous understory - stable (3)

1996 TREND ASSESSMENT

Trend for soil is stable. Ground cover characteristics are similar compared to 1990 estimates. Erosion is occurring, but not at a significant level due to the gentle terrain. Trend for browse is down slightly due to the 46% decline in density of Wyoming big sagebrush. The change is principally due to a drop in the number of young plants. Density of mature plants remained similar to 1984 estimates. The percentage of decadent plants classified as dying has increased from 9% to 28%. Use is more moderate and percent decadence has declined from 43% to 31%. Trend for the herbaceous understory is up slightly due to an increase in the sum of nested frequency for perennial grasses and forbs. Western wheatgrass declined slightly in nested frequency, while Sandberg bluegrass increased significantly. The increase in forb sum of nested frequency came largely from significant increases in hoods phlox and longleaf phlox.

TREND ASSESSMENT
soil - stable (3)
browse - down slightly (2)
herbaceous understory - slightly up (4)

2001 TREND ASSESSMENT

Trend for soil is up slightly. Percent bare ground is still high at 32%, but litter cover, cryptogams, and vegetation cover have all increased since 1996. There is still some localized erosion occurring but it is not significant due to the gentle terrain. The erosion condition class was determined to be slight in 2001. Trend for Wyoming big sagebrush appears stable with a similar density compared to 1996. Utilization continues to be light to moderate, vigor good on most plants, and percent decadence has declined slightly from 31% to 26%. Recruitment is poor with no seedlings encountered and young plants accounting for only 1% of the population. Without an improvement in reproduction, this population will likely decline slightly in the future since 12% of the decadent plants were classified as dying. Trend for the herbaceous understory is stable with similar sum of nested frequency values for perennial grasses and forbs compared to 1996. The two dominant perennial grasses, western wheatgrass and Sandberg bluegrass, have remained stable.

TREND ASSESSMENT
soil - up slightly (4)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 04 , Study no: 14

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
G	Agropyron cristatum	-	-	-	2	-	-	-	1	.00	.15
G	Agropyron smithii	206	220	202	215	72	85	71	73	1.81	2.99
G	Agropyron spicatum	b30	b13	a-	a1	14	7	-	1	-	.00
G	Bromus tectorum (a)	-	-	a-	b16	-	-	-	7	-	.04
G	Oryzopsis hymenoides	a4	ab11	b27	ab19	2	4	12	11	.21	.21
G	Poa fendleriana	-	-	-	7	-	-	-	3	-	.06
G	Poa secunda	ab205	a178	b234	b231	82	71	89	83	4.33	7.26
G	Sitanion hystrix	b15	a1	ab13	a-	7	1	4	-	.07	-
G	Stipa comata	-	3	-	6	-	2	-	3	-	.18
Total for Annual Grasses		0	0	0	16	0	0	0	7	0	0.04
Total for Perennial Grasses		460	426	476	481	177	170	176	175	6.43	10.87
Total for Grasses		460	426	476	497	177	170	176	182	6.43	10.92
F	Alyssum alyssoides (a)	a-	a-	b19	c164	-	-	9	53	.04	.44
F	Antennaria rosea	b38	b38	a9	a4	15	16	4	2	.24	.18
F	Arabis drummondi	-	-	2	-	-	-	2	-	.01	-
F	Arenaria spp.	3	-	-	-	2	-	-	-	-	-
F	Astragalus convallarius	-	5	-	1	-	2	-	1	-	.01
F	Astragalus spp.	7	7	3	8	2	3	1	4	.00	.12
F	Astragalus utahensis	-	1	-	-	-	1	-	-	-	-
F	Cordylanthus ramosus (a)	-	-	-	2	-	-	-	1	-	.03
F	Cryptantha spp.	B11	b14	ab4	a-	7	7	2	-	.06	-
F	Cymopterus spp.	-	-	3	5	-	-	2	3	.01	.04
F	Descurainia pinnata (a)	-	-	-	7	-	-	-	4	-	.02
F	Draba spp. (a)	-	-	-	1	-	-	-	1	-	.00
F	Erigeron pumilus	-	5	7	11	-	2	3	5	.01	.12
F	Haplopappus acaulis	1	4	3	1	1	2	1	1	.03	.03
F	Lappula occidentalis (a)	-	-	-	5	-	-	-	2	-	.01
F	Microsteris gracilis (a)	-	-	-	6	-	-	-	2	-	.01
F	Phlox hoodii	a71	ab108	c145	bc110	32	45	60	53	3.79	1.88
F	Phlox longifolia	a16	a6	b56	b64	6	3	26	28	.28	.24

Type	Species	Nested Frequency				Quadrat Frequency				Average Cover %	
		'84	'90	'96	'01	'84	'90	'96	'01	'96	'01
F	Ranunculus testiculatus (a)	-	-	8	17	-	-	5	7	.02	.03
F	Senecio integerrimus	-	-	-	1	-	-	-	1	-	.00
F	Trifolium spp.	5	7	-	1	3	3	-	1	-	.00
F	Unknown forb-perennial	-	2	-	-	-	1	-	-	-	-
Total for Annual Forbs		0	0	27	202	0	0	14	70	0.07	0.55
Total for Perennial Forbs		152	197	232	206	68	85	101	99	4.44	2.65
Total for Forbs		152	197	259	408	68	85	115	169	4.51	3.20

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 04 , Study no: 14

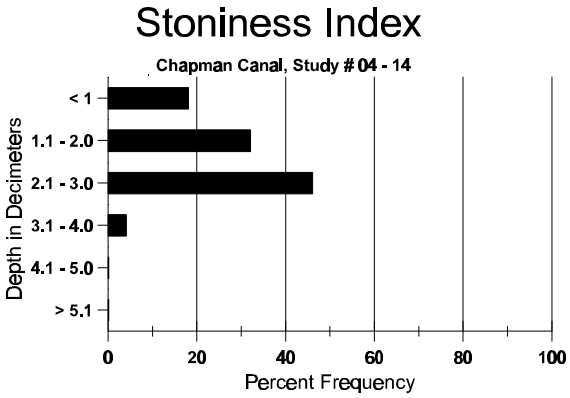
Type	Species	Strip Frequency		Average Cover %	
		'96	'01	'96	'01
B	Artemisia tridentata wyomingensis	88	84	14.79	18.32
B	Atriplex gardneri falcata	7	14	.53	.09
B	Ceratoides lanata	8	8	.21	-
B	Chrysothamnus viscidiflorus stenophyllus	82	83	5.54	4.51
B	Opuntia spp.	13	4	.21	.53
B	Tetradymia canescens	1	2	-	.15
Total for Browse		199	195	21.29	23.60

BASIC COVER --
Herd unit 04 , Study no: 14

Cover Type	Nested Frequency		Average Cover %			
	'96	'01	'84	'90	'96	'01
Vegetation	335	352	2.00	8.50	28.93	38.24
Rock	25	10	0	.25	.07	.06
Pavement	119	165	0	.75	.63	1.22
Litter	387	359	43.25	31.00	27.83	31.87
Cryptogams	244	292	10.00	18.25	12.77	21.15
Bare Ground	344	298	44.75	41.25	40.43	31.89

SOIL ANALYSIS DATA --
Herd Unit 04, Study no: 14, Chapman Canal

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
10.7	61.0 (9.4)	8.0	44.8	26.0	29.3	1.9	5.5	67.2	.7



PELLET GROUP FREQUENCY --
Herd unit 04 , Study no: 14

Type	Quadrat Frequency	
	'96	'01
Rabbit	9	28
Elk	5	2
Deer	24	25
Cattle	1	-
Coyote	-	-

Pellet Transect	
Pellet Groups per Acre '01	Days Use per Acre (ha) '01
287	N/A
70	5 (13)
392	30 (74)
61	5 (13)
9	N/A

BROWSE CHARACTERISTICS --
Herd unit 04 , Study no: 14

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata wyomingensis																		
S	84	13	1	-	-	-	-	-	-	-	14	-	-	-	933			14
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	11	11	-	-	-	-	-	-	-	22	-	-	-	1466			22
	90	18	13	1	-	-	-	-	-	-	30	2	-	-	2133			32
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	01	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
M	84	-	15	17	-	-	-	-	-	-	31	-	1	-	2133	13	19	32
	90	7	14	6	-	-	-	-	-	-	27	-	-	-	1800	15	18	27
	96	93	31	-	-	-	-	-	-	-	123	-	1	-	2480	18	34	124
	01	79	60	3	-	3	2	-	-	-	147	-	-	-	2940	19	33	147
D	84	-	4	44	-	-	-	-	-	-	30	1	14	3	3200			48
	90	10	24	9	1	-	-	-	-	-	31	9	-	4	2933			44
	96	26	29	3	-	-	-	-	-	-	42	-	-	16	1160			58
	01	25	24	-	1	-	2	-	-	-	44	2	-	6	1040			52
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	760			38
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	760			38

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	29%	60%	18%	+ 1%
'90	50%	16%	04%	-46%
'96	32%	02%	09%	+ 8%
'01	43%	03%	03%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	6799	Dec:		47%
'90	6866			43%
'96	3700			31%
'01	4040			26%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex canescens																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0	22	36	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'84	00%	00%	00%
'90	00%	00%	00%
'96	00%	00%	00%
'01	00%	00%	00%

%Change

Total Plants/Acre (excluding Dead & Seedlings)			
	'84	0	Dec: -
	'90	0	-
	'96	0	-
	'01	0	-

Atriplex gardneri falcata																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	22	-	-	-	-	-	-	-	-	22	-	-	-	440			22
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	30	-	-	-	-	-	-	-	-	30	-	-	-	600	4	9	30
	01	19	1	-	-	-	-	-	-	-	20	-	-	-	400	3	7	20

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor
'84	00%	00%	00%
'90	00%	00%	00%
'96	00%	00%	00%
'01	02%	00%	00%

%Change

+29%

Total Plants/Acre (excluding Dead & Seedlings)			
	'84	0	Dec: -
	'90	0	-
	'96	600	-
	'01	840	-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Ceratoides lanata																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80			4
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	8	2	-	1	-	-	-	-	-	11	-	-	-	220	5	7	11
	01	7	2	2	-	-	-	-	-	-	11	-	-	-	220	6	10	11

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	13%	00%	00%	-20%
'01	17%	17%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:		-
'90	0			-
'96	300			-
'01	240			-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Chrysothamnus viscidiflorus stenophyllus																		
Y	84	11	-	-	-	-	-	-	-	-	11	-	-	-	733			11
	90	10	3	-	-	-	-	-	-	-	12	-	1	-	866			13
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60			3
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	84	47	-	-	-	-	-	-	-	-	47	-	-	-	3133	10	11	47
	90	13	18	2	4	-	-	1	-	-	37	1	-	-	2533	5	7	38
	96	147	2	-	11	-	-	-	-	-	156	-	-	4	3200	10	17	160
	01	149	2	-	4	-	-	-	-	-	155	-	-	-	3100	8	15	155
D	84	1	4	-	-	-	-	-	-	-	5	-	-	-	333			5
	90	7	9	1	1	-	-	-	-	-	13	4	1	-	1200			18
	96	43	-	-	7	-	-	-	-	-	45	-	-	5	1000			50
	01	56	-	-	-	-	-	-	-	-	48	-	-	8	1120			56
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	40			2
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	06%	00%	00%	+ 9%
'90	43%	04%	03%	- 7%
'96	.93%	00%	04%	- 0%
'01	.94%	00%	04%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	4199	Dec:	8%
	'90	4599		26%
	'96	4260		23%
	'01	4240		26%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia spp.																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	5	-	-	-	-	-	-	-	-	5	-	-	-	333			5
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	4	-	-	-	-	-	-	-	-	4	-	-	-	266	4	9	4
	90	2	-	-	-	-	-	-	-	-	-	-	2	-	133	5	3	2
	96	22	-	-	-	-	-	-	-	-	22	-	-	-	440	4	15	22
	01	3	-	-	-	-	-	-	-	-	3	-	-	-	60	3	11	3
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40			2
	01	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	+43%
'90	00%	00%	29%	+ 3%
'96	00%	00%	00%	-83%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	266	Dec:		0%
'90	466			0%
'96	480			8%
'01	80			25%

Tetradymia canescens

M	84	-	2	-	-	-	-	-	-	-	2	-	-	-	133	7	14	2
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	8	7	0
	01	2	-	-	-	-	-	-	-	-	2	-	-	-	40	7	10	2
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	-	-	-	1	20			1
	01	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	100%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	100%	+50%
'01	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)			
'84	133	Dec:	0%
'90	0		0%
'96	20		100%
'01	40		0%